

**Wilson Lake
1999 Water Quality Report**

1. General.

a. **Project location.** Wilson Dam is located approximately 10 miles north of Wilson, Kansas, at river mile 153.9 on the Saline River, a tributary of the Smoky Hill River. The project watershed encompasses 1,917 square miles in central Kansas.

b. **Authorized project purposes.** Flood control and irrigation are the primary project purposes; equally important, however, are its excellent fish and wildlife resources and recreation benefits.

c. Pertinent data.

Pools	Surface Elevation (ft. above m.s.l.)	Current Capacity (1,000 A.F.)	Surface Area (acres)	Shoreline (miles)
Flood Control	1,554.0	529.8	20,000	
Multipurpose	1,516.0	233.6*	9,000	100
Inactive		34.2**		
Total		763.4		

Total Drainage Area: 1,917 sq. miles

Average Annual Inflow: 97,845 acre-feet

* Based on most recent hydrographic survey.

** Contained in multipurpose pool.

2. Activities and studies of the year.

Monthly herbicide and nutrient sampling was conducted by lake project personnel, with technical and analytical support from PM-PR-W, April-September 1999 at one inflow station, three lake stations (two depths), and the outlet. Nutrient samples were shipped to the Chemical and Materials Quality Assurance Laboratory (CMQAL) in Omaha for analysis, while the herbicide samples were shipped to the PM-PR-W laboratory for analysis of four of the most commonly occurring herbicides by the ELISA (enzyme linked immunosorbent assay) method. Ten percent of the herbicide samples were shipped to the CMQAL to be analyzed by Gas Chromatography (GC) for quality control purposes. All generated data were entered in excel spreadsheets as an interim to the EPA national water quality data management system, NEW

STORET, which is still in the developmental stage. Table 1 at the end of this report includes all the available nutrient and herbicide data for the past years from 1996-1999.

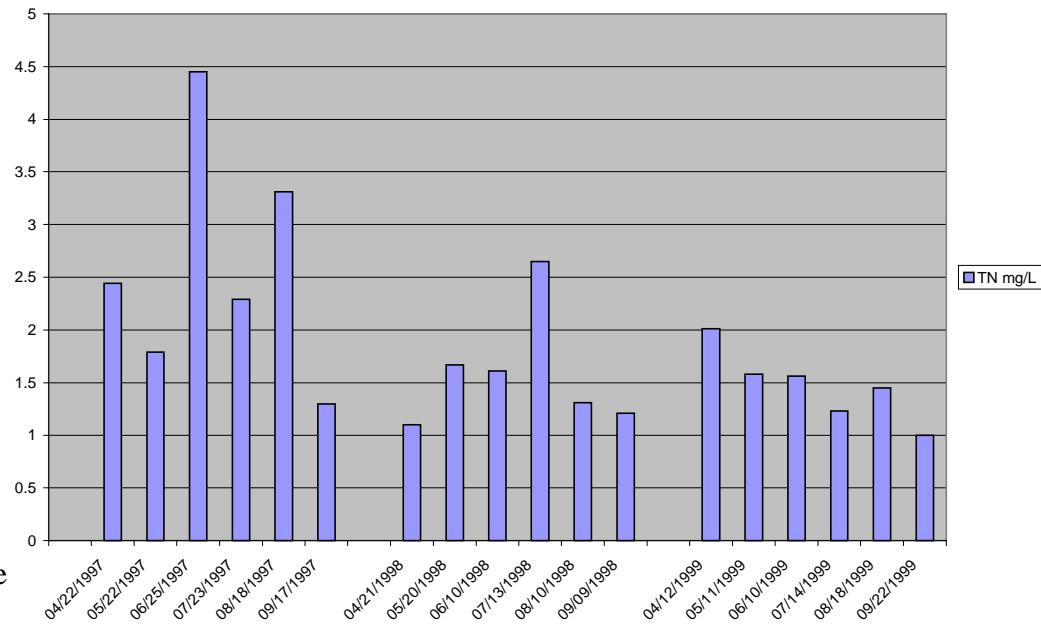
The OF-WI is to be commended for its continued support of water quality monitoring of Wilson Lake and its tributaries. The OF-WI personnel deserving special recognition include Messrs. Ken Wade, Stanton Rains, and Dennis Archer.

3. Existing conditions.

FIGURE 1: WI-1

a. Inflow.

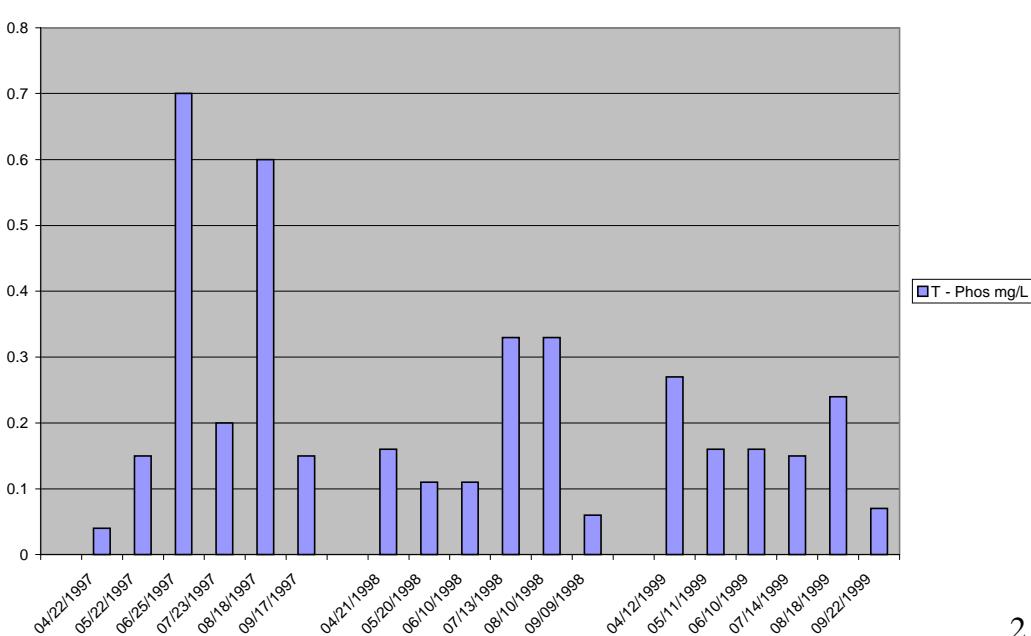
The Saline River north of Russell, Kansas, (station WI-1), was sampled monthly from April-September 1999. The 1999 monthly samples were analyzed for the presence of nutrients and the four common



herbicides, atrazine, alachlor, metolachlor, and cyanazine. The nutrient-enriched character

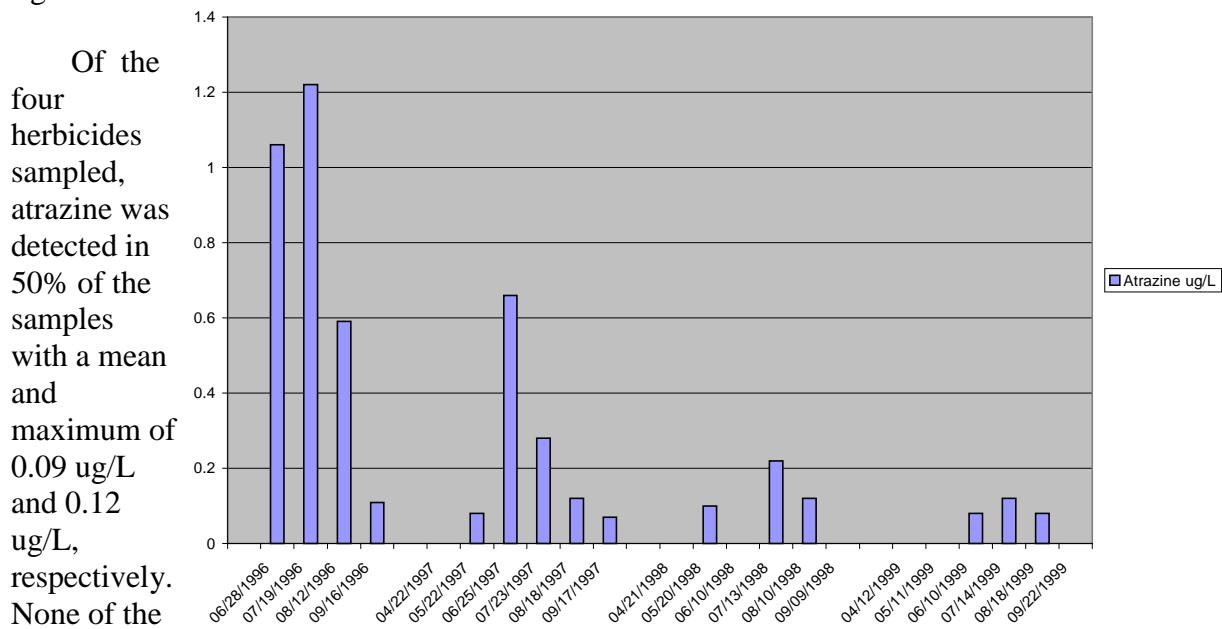
FIGURE 2: WI-1

of the stream was reflected in total nitrogen (TN) concentrations (i.e., $\text{NH}_3 + \text{NO}_2 + \text{NO}_3 + \text{TKN}$) with a mean, minimum, and maximum of 1.47 mg/L, 1.00 mg/L, and 2.01 mg/L,



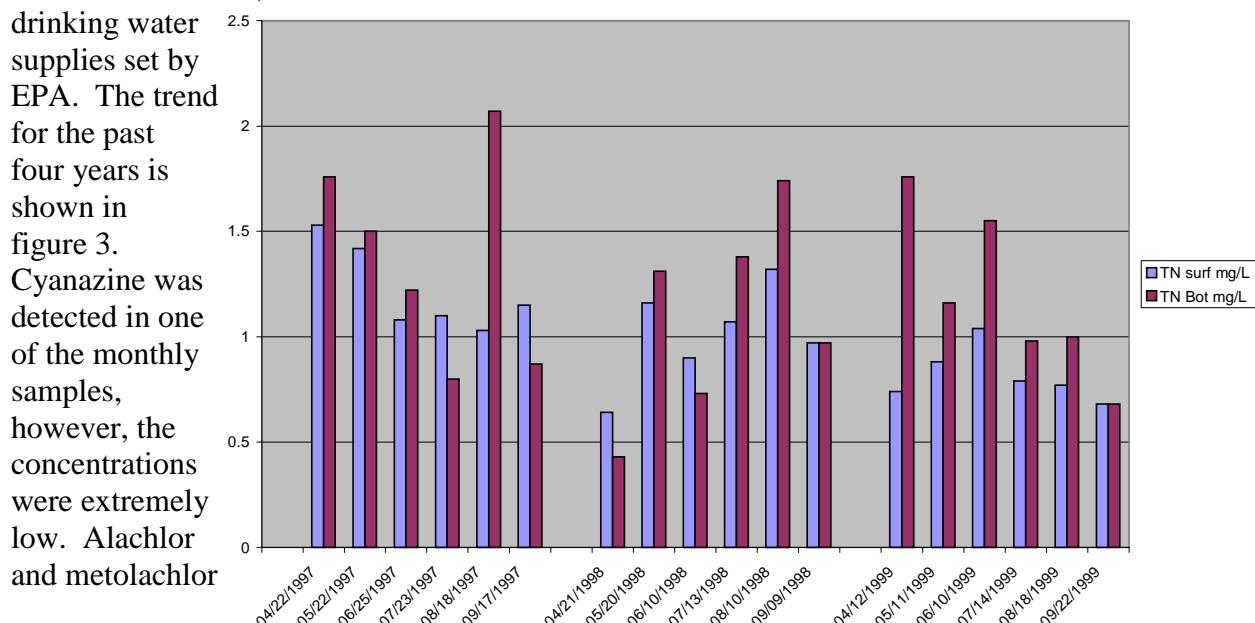
respectively. These concentrations continue to exceed the EPA criterion of 1 mg/L for streams. Figure 1 shows the trend for total nitrogen concentrations over the past three years. As can be seen from this graph, levels have typically been above eutrophic levels with spikes occurring during high inflows such as June 1997. The 1999 total phosphorus (TP) concentrations also reflected moderate to highly enriched conditions with a mean, minimum, and maximum of 0.18 mg/L, 0.07 mg/L, (non-run off period of September), and 0.27 mg/L, respectively. These concentrations continued to exceed the EPA criterion of 0.1 mg/L for the protection of the aquatic ecosystems. This trend can be seen in figure 2.

FIGURE 3: WI-1



samples exceeded the 3ug/L MCL (Maximum Contaminant Level) for

FIGURE 4: WI-15A



were not detected in any of the monthly samples.

At this time there continues to be no

threat of high
herbicide
contamination
to the inflow of
Wilson Lake.

b. Lake.

The three stations sampled during the six-month sampling period from mid April-September were WI-15A (downlake), WI-13 (midlake), and

WI-9 (uplake). As can be seen in figures 4, 5, and 6, nutrient concentrations were typical of the impoundment over the period of record. These three graphs show the relationship between surface and bottom concentrations for the past three years. Concentrations throughout the lake appear to be fairly uniform. The high spikes can be attributed to high inflows and temperature differences between surface and bottom waters. Mean TN concentrations indicate a moderately to highly enriched condition within the lake. Mean

and maximum TN concentrations in the

surface waters were WI-15A, 0.82 mg/L and 0.88 mg/L, respectively; WI-13, 0.84 mg/L and 1.06 mg/L, respectively; and WI-9, 1.16 mg/L and 1.83 mg/L, respectively.

Thirty-three percent of these concentrations exceed the EPA criterion of 1 mg/L. Total nitrogen

FIGURE 5: WI-13

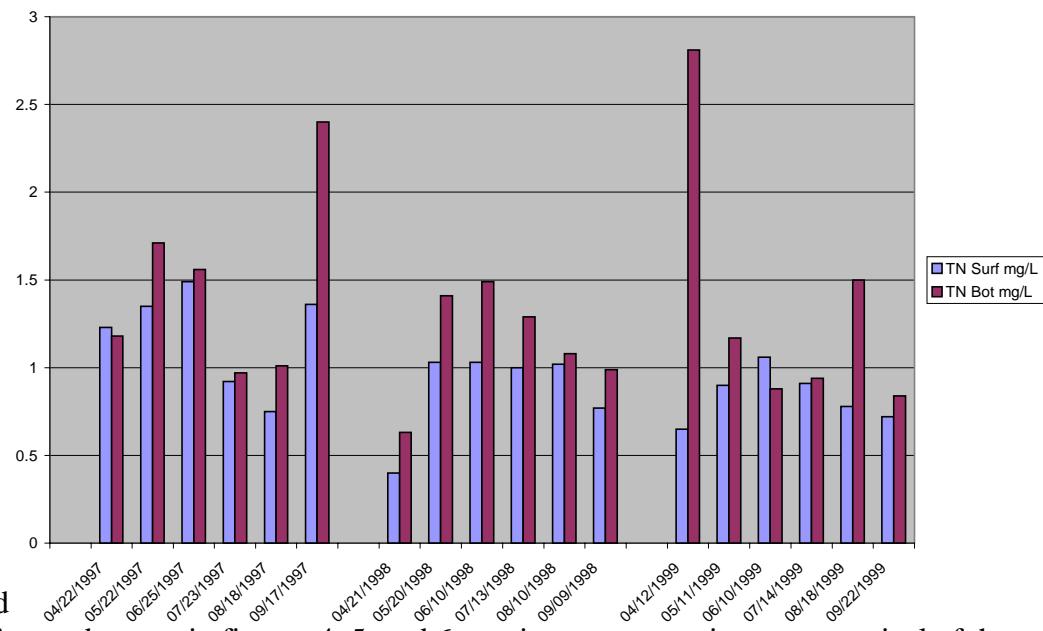
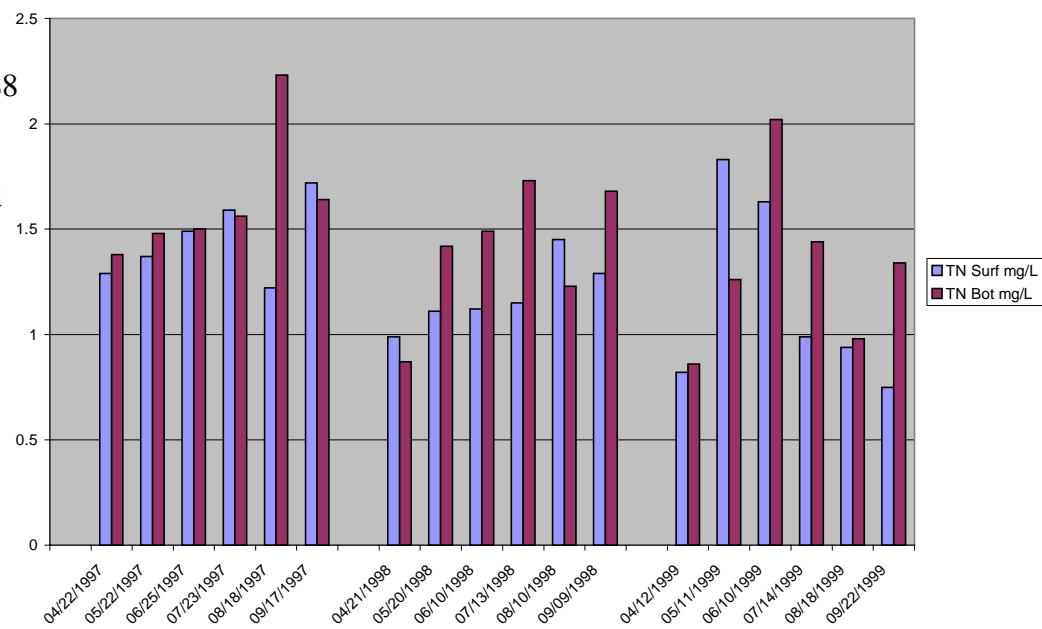


FIGURE 6: WI-9



mean and maximum concentrations in the bottom waters were WI-15A, 1.19 mg/L and 1.76, respectively; WI-13, 1.36 mg/L and 2.81 mg/L, respectively; and WI-9, 1.32 mg/L and 2.02 mg/L, respectively. Total phosphorus concentrations in the surface waters reflected only moderately enriched conditions with

means of 0.03 mg/L at WI-15A, 0.03 mg/L at WI-13, and 0.06 mg/L at WI-9. Bottom TP concentrations were much higher with mean concentrations of 0.10 mg/L, 0.16 mg/L, and 0.11mg/L, respectively. Sixty-seven percent of these concentrations exceed the 0.05 mg/L EPA eutrophy criterion. As with TN, the bottom concentrations of TP play a significant role in the reservoir's eutrophy. Figures 7, 8, and 9 show

total phosphorus concentrations at the surface and bottom depths throughout the lake from 1997-1999. The total phosphorus concentrations tend to follow the same pattern as the total nitrogen concentrations, fairly uniform throughout the lake.

FIGURE 7: WI-15A

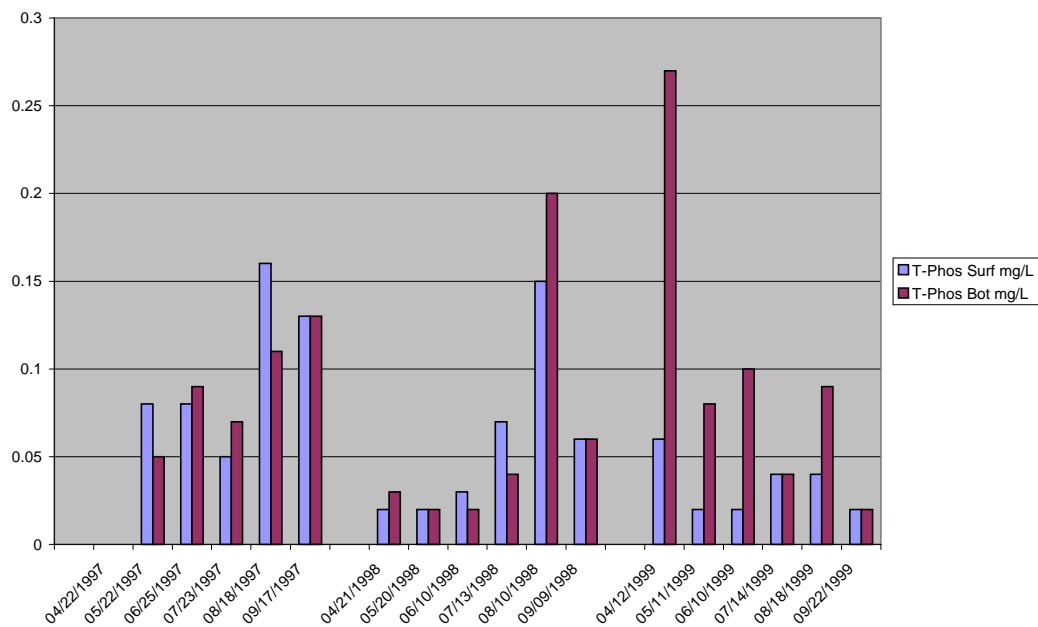


FIGURE 8: WI-13

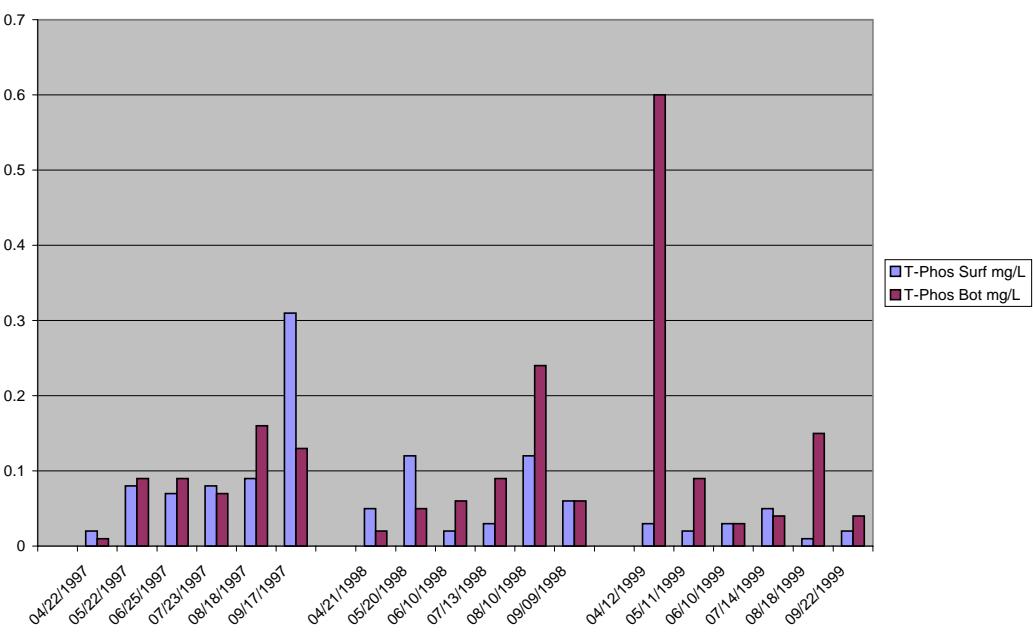
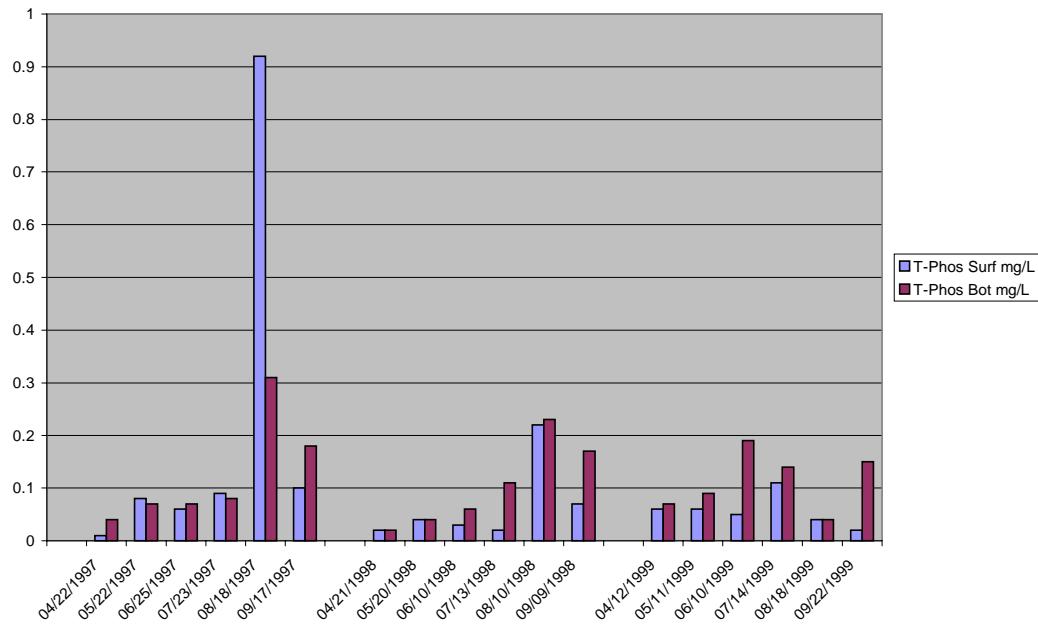


FIGURE 9: WI-9

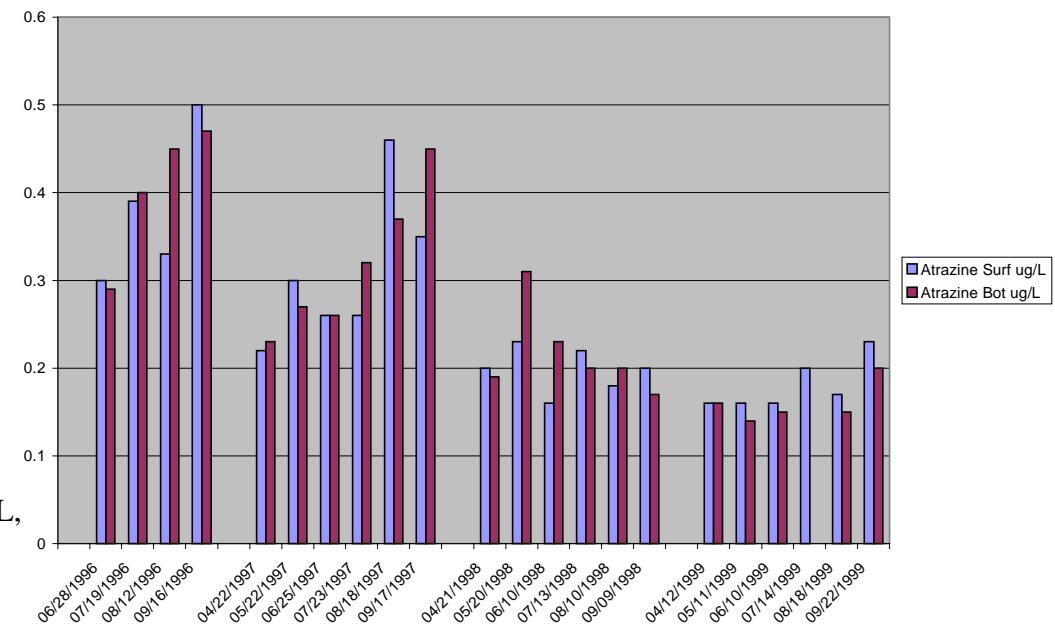


Atrazine was detected in 100% of the samples collected from April-September 1999. The mean and maximum atrazine concentrations in the surface waters of the lake were 0.18 ug/L and 0.23 ug/L (WI-15A); 0.15 ug/L and 0.20 ug/L (WI-13); and 0.24 ug/L and 0.37 ug/L (WI-9), respectively.

Bottom mean and maximum atrazine concentrations for the above areas were as follows: 0.16 ug/L and 0.20 ug/L; 0.16 ug/L and 0.23 ug/L; and 0.22 ug/L and 0.37 ug/L, respectively. No samples exceeded the MCL for

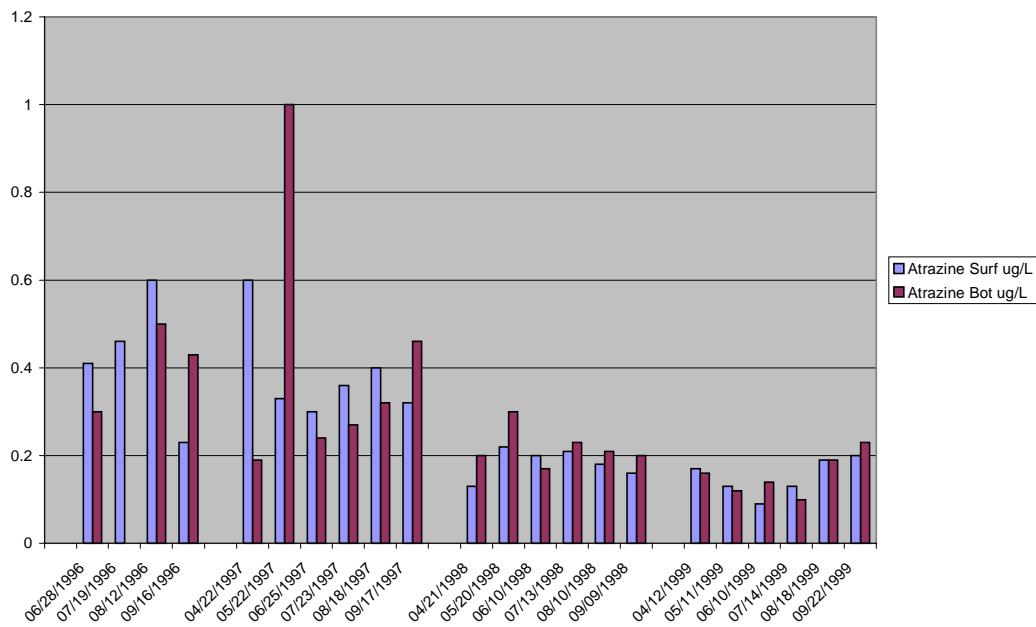
atrazine. Figures 10, 11, and 12 show the trend for atrazine for the years 1996-1999. As can be seen from these graphs higher concentrations occur throughout the lake during high flow periods and then level off. For the most part concentrations are uniform throughout the water

FIGURE 10: WI-15A



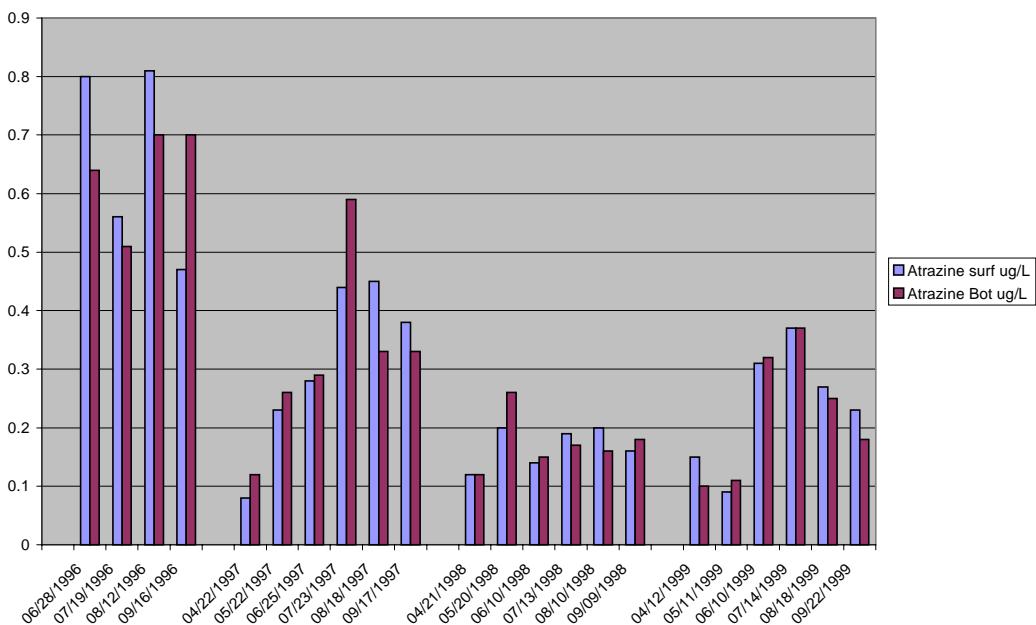
column. Alachlor, cyanazine, and metolachlor were detected in 94%, 83%, and 74%

FIGURE 11: WI-13



respectively, of the 1999 samples. These data and past data suggest that herbicides are not a major problem within the lake.

FIGURE 12: WI-9



c. **Outflow.** The present sampling indicated the water quality

conditions in the outlet (WI-16) continue to be satisfactory. The nutrient levels remained moderate with mean TN and TP

concentrations

of 0.91 mg/L and 0.03 mg/L, respectively. Again as shown in figures 13, and 14, the concentrations are higher during high flow periods. Of the four herbicides only atrazine, metolachlor, and cyanazine were detected in the release waters. The mean and maximum concentrations for atrazine were 0.16 ug/L and 0.18 ug/L, respectively. None of the samples exceeded the set standard. Figure 15 shows

the trend for atrazine

for the years 1996-1999. As can be seen from this graph,

FIGURE 13: WI-16

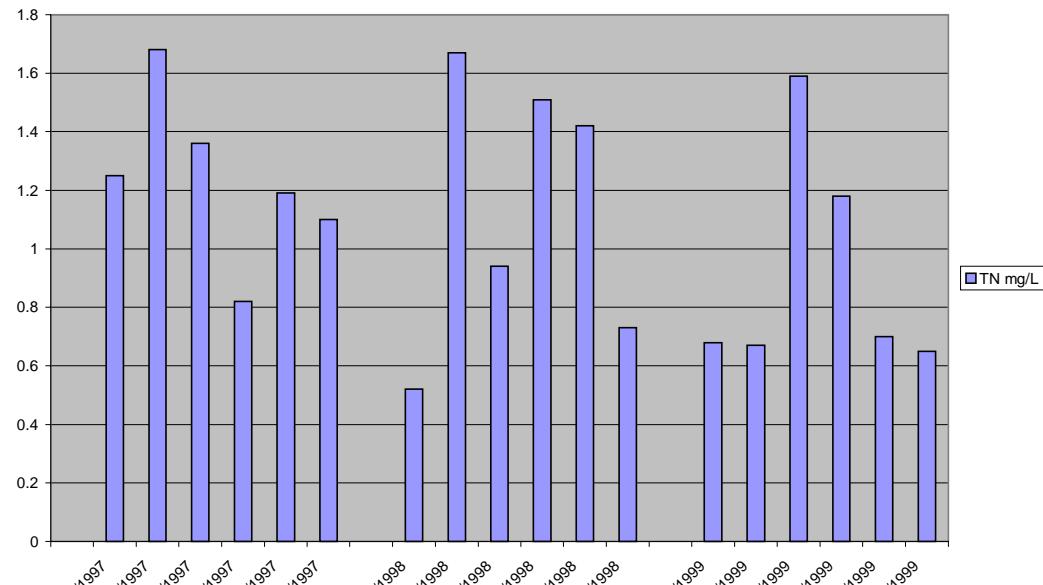
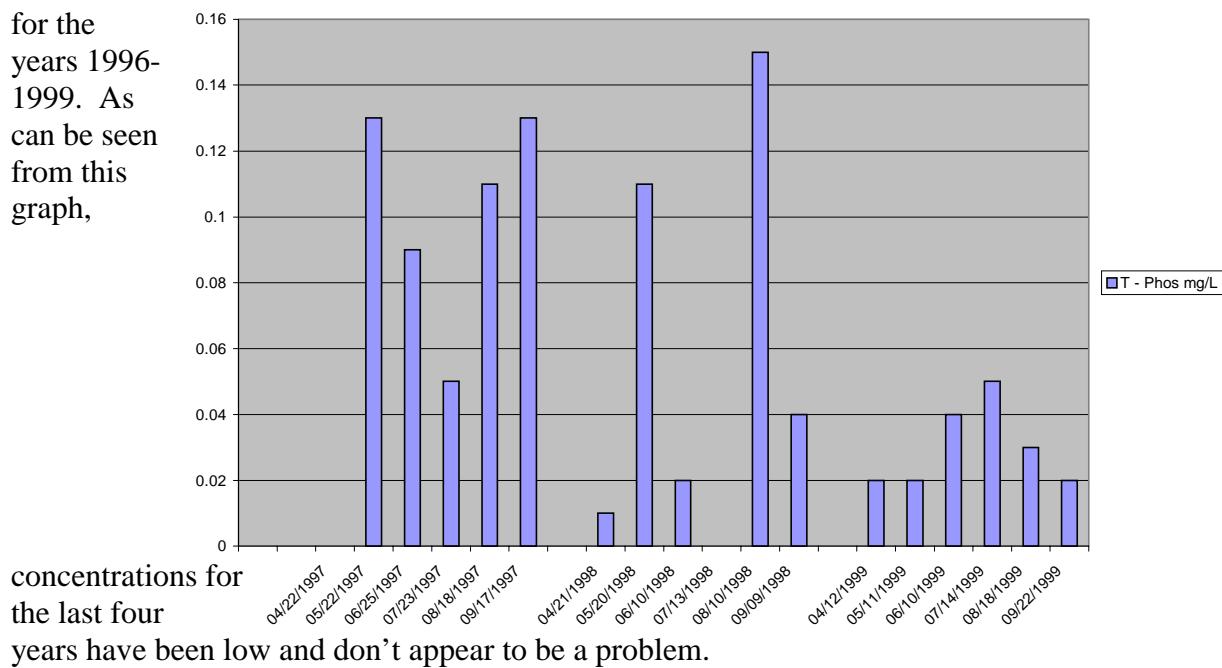
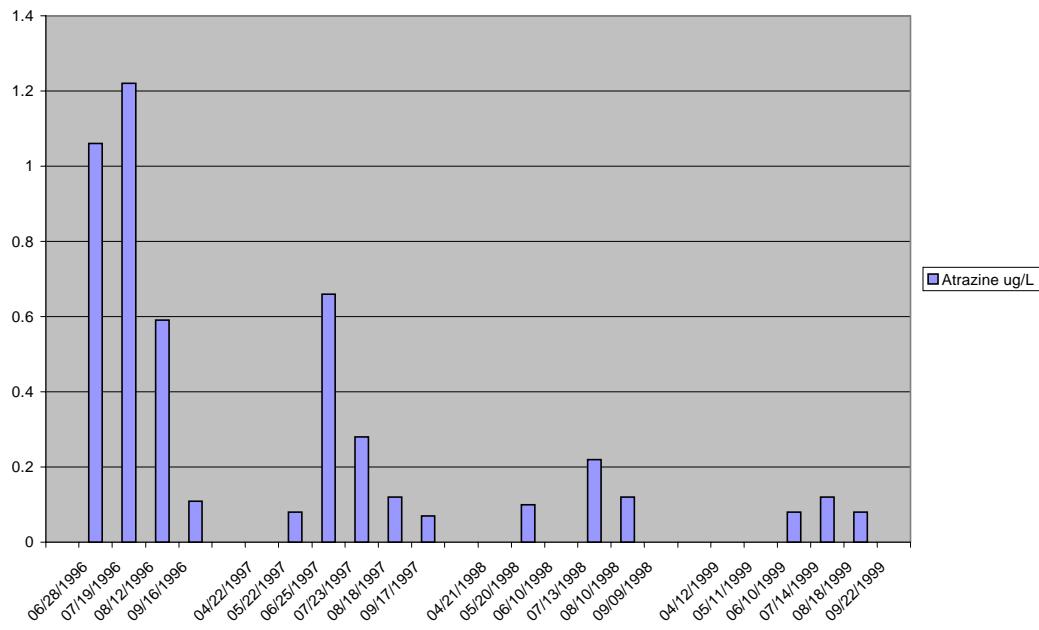


FIGURE 14: WI-16



concentrations for the last four years have been low and don't appear to be a problem.

FIGURE 15: WI-1



4. Future conditions.

The water quality of Wilson Lake is high as evidenced by its excellent sport fishery of striped and smallmouth bass. The lake has had relatively stable water quality conditions for much of its 30 years. Substantial storm events can temporarily change water chemistry, but the lake's future water quality should be little changed unless land use practices change dramatically.

5. Recommendations.

Because of the excellent, long-term water quality of the impoundment, the PM-PR-W does not recommend intensive monitoring of Wilson Lake in 2000. Routine monthly nutrient and pesticide sampling should continue to be conducted by Project personnel with logistical and analytical support from PM-PR-W.

TABLE 1: WILSON LAKE DATA 1996-1999

Station	Depth M	Date mm/dd/yy	Time hhmm	Atrazine ug/L	Alachlor ug/L	Metolachlor ug/L	Cyanazine ug/L	Ammonia mg/L	NO3/NO2 mg/L	TKN mg/L	TN mg/L	T - Phos mg/L	T - Ortho-P mg/L
WI - 16	0.1	06/28/1996	1300	0.32	<0.05	<0.05	<0.04						
	0.1	07/19/1996	2030	0.23	<0.05	<0.05	<0.04						
	0.1	09/16/1996	1500	0.42	<0.05	<0.05	0.05						
Average				0.32			0.05						
WI - 16	0.1	04/22/1997	1130	0.24	0.06	<0.05	0.05	0.02	0.03	1.2	1.25	<0.01	0.01
	0.1	05/22/1997	1715	0.29	0.06	<0.05	<0.04	0.15	0.03	1.5	1.68	0.13	0.02
	0.1	06/25/1997	1555	0.29	<0.05	<0.05	<0.04	0.06	0.2	1.1	1.36	0.09	0.03
	0.1	07/23/1997	1620	0.27	0.13	<0.05	0.1	0.15	0.17	0.5	0.82	0.05	0.04
	0.1	08/18/1997	1120	0.32	<0.05	<0.05	0.06	0.07	0.02	1.1	1.19	0.11	0.02
	0.1	09/17/1997	1430	0.42	0.05	<0.05	0.06	0.14	0.06	0.9	1.1	0.13	0.03
Average				0.31	0.08		0.07	0.10	0.09	1.05	1.23	0.10	0.03
WI - 16	0.1	04/21/1998	1145	0.24	<0.05	<0.05	<0.04	0.02	<0.01	0.5	0.52	0.01	0.01
	0.1	05/20/1998	1100	0.21	<0.05	<0.05	<0.04	0.01	0.26	1.4	1.67	0.11	0.02
	0.1	06/10/1998	1450	0.25	<0.05	0.05	<0.04	0.04	0.1	0.8	0.94	0.02	0.02
	0.1	07/13/1998	0845	0.06	<0.05	<0.05	<0.04	0.07	0.24	1.2	1.51	<0.01	<0.01
	0.1	08/10/1998	1200	0.25	0.13	<0.05	0.05	<0.02	0.02	1.4	1.42	0.15	0.02
	0.1	09/09/1998	1015	0.2	<0.05	<0.05	<0.04	0.13	0.1	0.5	0.73	0.04	0.01
Average				0.20	0.13	0.05	0.05	0.05	0.14	0.97	1.13	0.07	0.02
WI - 16	0.1	04/12/1999	1245	0.17	<0.05	<0.05	<0.04	0.03	0.08	0.57	0.68	0.02	0.01
	0.1	05/11/1999	0924	0.13	<0.05	<0.05	<0.04	0.05	0.07	0.55	0.67	0.02	U
	0.1	06/10/1999	1035					0.18	0.1	1.31	1.59	0.04	0.02
	0.1	07/14/1999	1015	0.15	<0.05	<0.05	0.16	0.16	0.04	0.98	1.18	0.05	U
	0.1	08/18/1999	1045	0.18	<0.05	0.07	<0.04	0.01	U	0.69	0.7	0.03	0.03
	0.1	09/22/1999	1040	0.16	<0.05	<0.05	<0.04	U	0.03	0.62	0.65	0.02	0.01
Average				0.16		0.07	0.16	0.09	0.06	0.79	0.91	0.03	0.02
WI - 1	0.1	06/28/1996	1130	1.06	0.06	0.23	0.08						
	0.1	07/19/1996	0830	1.22	<0.05	0.07	0.05						
	0.1	08/12/1996	1100	0.59	<0.05	0.13	0.09						
	0.1	09/16/1996	1540	0.11	<0.05	<0.05	<0.04						
Average				0.75	0.06	0.14	0.07						
WI - 1	0.1	04/22/1997	1500	<0.05	<0.05	<0.05	<0.04	0.74	0.4	1.3	2.44	0.04	0.01
	0.1	05/22/1997	1200	0.08	<0.05	<0.05	<0.04	0.09		1.7	1.79	0.15	0.02
	0.1	06/25/1997	1500	0.66	0.16	0.82	0.09	0.02	0.33	4.1	4.45	0.7	0.09
	0.1	07/23/1997	1700	0.28	0.06	0.05	0.07	0.17	0.22	1.9	2.29	0.2	0.06
	0.1	08/18/1997	1330	0.12	<0.05	<0.05	<0.04	0.02	0.19	3.1	3.31	0.6	0.12
	0.1	09/17/1997	1155	0.07	0.06	<0.05	<0.04	0.15	0.15	1	1.3	0.15	0.05
Average				0.24	0.09	0.44	0.08	0.20	0.26	2.18	2.60	0.31	0.06

Station	Depth M	Date mm/dd/yy	Time hhmm	Atrazine ug/L	Alachlor ug/L	Metolachlor ug/L	Cyanazine ug/L	Ammonia mg/L	NO3/NO2 mg/L	TKN mg/L	TN mg/L	T - Phos mg/L	T - Ortho-P mg/L	
WI - 1	0.1	04/21/1998	1100	<0.05	<0.05	<0.05	<0.04	<0.02	0.4	0.7	1.1	0.16	0.04	
	0.1	05/20/1998	1530	0.1	<0.05	0.05	<0.04	0.01	0.26	1.4	1.67	0.11	0.02	
	0.1	06/10/1998	1445	<0.05	<0.05	<0.05	<0.04	<0.02	0.41	1.2	1.61	0.11	0.06	
	0.1	07/13/1998	0945	0.22	<0.05	<0.05	<0.04	0.05	0.6	2	2.65	0.33	0.13	
	0.1	08/10/1998	1100	0.12	<0.05	<0.05	<0.04	<0.02	0.21	1.1	1.31	0.33	0.03	
	0.1	09/09/1998	0954	<0.05	<0.05	<0.05	<0.04	0.12	0.69	0.4	1.21	0.06	0.04	
Average				0.15		0.05		0.06	0.43	1.13	1.59	0.18	0.05	
WI-1	0.1	04/12/1999	1115	<0.05	<0.05	<0.05	<0.04	U	0.26	1.75	2.01	0.27	0.03	
	0.1	05/11/1999	0845	<0.05	<0.05	<0.05	<0.04	0.05	0.11	1.42	1.58	0.16	0.04	
	0.1	06/10/1999	0950	0.08	<0.05	<0.05	<0.04	0.11	0.04	1.41	1.56	0.16	0.03	
	0.1	07/14/1999	0923	0.12	<0.05	<0.05	0.16	0.07	U	1.16	1.23	0.15	0.01	
	0.1	08/18/1999	1100	0.08	<0.05	<0.05	<0.04	0.11	U	1.34	1.45	0.24	0.05	
	0.1	09/22/1999	0945	<0.05	<0.05	<0.05	<0.04	U	0.22	0.78	1	0.07	0.01	
Average				0.09		0.05		0.16	0.09	0.16	1.31	1.47	0.18	0.03
WI - 9	0.1	06/28/1996	1000	0.8	<0.05	0.1	0.05							
	0.1	07/19/1996	1830	0.56	<0.05	<0.05	<0.04							
	0.1	08/12/1996	1430	0.81	<0.05	0.05	0.08							
	0.1	09/16/1996	1340	0.47	<0.05	<0.05	0.07							
Average				0.66		0.08		0.07						
WI - 9	0.1	04/22/1997	1300	0.08	<0.05	<0.05	<0.04	0.05	0.44	0.8	1.29	0.01	0.01	
	0.1	05/22/1997	1400	0.23	<0.05	<0.05	<0.04	0.06	0.01	1.3	1.37	0.08	0.02	
	0.1	06/25/1997	0955	0.28	<0.05	<0.05	0.07	0.02	0.07	1.4	1.49	0.06	0.05	
	0.1	07/23/1997	1420	0.44	0.11	0.1	0.1	0.18	0.01	1.4	1.59	0.09	0.05	
	0.1	08/18/1997	0940	0.45	<0.05	<0.05	0.04	0.02	<0.01	1.2	1.22	0.92	0.04	
	0.1	09/17/1997	1315	0.38	<0.05	<0.05	0.04	0.02	0.2	1.5	1.72	0.1	0.05	
Average				0.31	0.11	0.10	0.06	0.06	0.15	1.27	1.45	0.21	0.04	
WI - 9	0.1	04/21/1998	0900	0.12	<0.05	<0.05	<0.04	0.19	0.2	0.6	0.99	0.02	0.02	
	0.1	05/20/1998	0930	0.2	<0.05	<0.05	0.04	<0.01	0.01	1.1	1.11	0.04	0.01	
	0.1	06/10/1998	0900	0.14	<0.05	0.05	<0.04	<0.02	0.02	1.1	1.12	0.03	0.02	
	0.1	07/13/1998	0800	0.19	<0.05	<0.05	<0.04	0.03	0.02	1.1	1.15	0.02	0.01	
	0.1	08/10/1998	0855	0.2	0.11	<0.05	0.04	0.12	0.03	1.3	1.45	0.22	0.02	
	0.1	09/09/1998	0843	0.16	<0.05	<0.05	<0.04	0.07	0.52	0.7	1.29	0.07	0.04	
Average				0.17	0.11	0.05	0.04	0.10	0.13	0.98	1.19	0.07	0.02	
WI - 9	0.1	04/12/1999	1100	0.15	<0.05	<0.05	<0.04	U	0.02	0.8	0.82	0.06	0.02	
	0.1	05/11/1999	0756	0.09	<0.05	<0.05	<0.04	0.44	0.11	1.28	1.83	0.06	0.02	
	0.1	06/10/1999	0843	0.31	<0.05	0.14	<0.04	0.6	0.07	0.96	1.63	0.05	0.03	
	0.1	07/14/1999	0845	0.37	0.07	0.06	0.19	0.03	U	0.96	0.99	0.11	0.01	
	0.1	08/18/1999	0932	0.27	<0.05	<0.05	0.05	U	0.06	0.88	0.94	0.04	0.04	
	0.1	09/22/1999	0911	0.23	<0.05	0.05	<0.04	U	U	0.75	0.75	0.02	0.01	
Average				0.24	0.07	0.08	0.12	0.36	0.07	0.94	1.16	0.06	0.02	

Station	Depth M	Date mm/dd/yy	Time hhmm	Atrazine ug/L	Alachlor ug/L	Metolachlor ug/L	Cyanazine ug/L	Ammonia mg/L	NO3/NO2 mg/L	TKN mg/L	TN mg/L	T - Phos mg/L	T - Ortho-P mg/L
WI - 9	7	06/28/1996	1007	0.64	<0.05	0.07	0.05						
	7	07/19/1996	1837	0.51	<0.05	0.05	0.05						
	7	08/12/1996	1437	0.7	<0.05	0.1	0.65						
	7	09/16/1996	1347	0.7	<0.1	0.08	<0.1						
Average				0.64		0.08	0.25						
WI - 9	6.7	04/22/1997	1307	0.12	<0.05	<0.05	<0.04	0.05	0.03	1.3	1.38	0.04	0.02
	7	05/22/1997	1407	0.26	<0.05	<0.05	<0.04	0.07	0.01	1.4	1.48	0.07	0.02
	7	06/25/1997	1002	0.29	<0.05	<0.05	0.08	0.03	0.07	1.4	1.5	0.07	0.06
	7	07/23/1997	1427	0.59	0.15	0.12	0.11	0.15	0.01	1.4	1.56	0.08	0.05
	7	08/18/1997	0947	0.33	<0.05	<0.05	0.05	0.03	<0.01	2.2	2.23	0.31	0.05
	7	09/17/1997	1322	0.33	<0.05	<0.05	0.05	0.08	0.06	1.5	1.64	0.18	0.07
Average				0.32	0.15	0.12	0.07	0.07	0.04	1.53	1.63	0.13	0.05
WI - 9	7	04/21/1998	0907	0.12	<0.05	<0.05	<0.04	0.34	0.13	0.4	0.87	0.02	0.02
	7	05/20/1998	0937	0.26	<0.05	<0.05	<0.04	0.09	0.03	1.3	1.42	0.04	0.01
	7	06/10/1998	0907	0.15	<0.05	0.06	<0.04	0.07	0.02	1.4	1.49	0.06	0.04
	7	07/13/1998	0807	0.17	<0.05	<0.05	<0.04	0.11	0.02	1.6	1.73	0.11	0.02
	7	08/10/1998	0902	0.16	<0.05	<0.05	<0.04	0.08	0.15	1	1.23	0.23	0.05
	7	09/09/1998	0850	0.18	<0.05	<0.05	<0.04	0.22	0.26	1.2	1.68	0.17	0.05
Average				0.17		0.06		0.15	0.10	1.15	1.40	0.11	0.03
WI - 9	7	04/12/1999	1107	0.1	<0.05	<0.05	<0.04	0.02	0.02	0.82	0.86	0.07	0.01
	7	05/11/1999	0803	0.11	<0.05	<0.05	<0.04	0.17	0.07	1.02	1.26	0.09	0.03
	7	06/10/1999	0850	0.32	<0.05	<0.05	<0.04	0.35	0.06	1.61	2.02	0.19	0.03
	7	07/14/1999	0852	0.37	0.05	0.09	0.19	0.09	U	1.35	1.44	0.14	0.01
	7	08/18/1999	0939	0.25	<0.05	0.1	<0.04	U	0.02	0.96	0.98	0.04	0.04
	7	09/22/1999	0918	0.18	<0.05	<0.05	<0.04	0.01	U	1.33	1.34	0.15	0.01
Average				0.22	0.05	0.10	0.19	0.13	0.04	1.18	1.32	0.11	0.02
WI - 13	0.1	06/28/1996	0930	0.41	<0.05	<0.05	<0.04						
	0.1	07/19/1996	1700	0.46	<0.05	<0.05	<0.04						
	0.1	08/12/1996	1500	0.6	<0.1	<0.1	<0.1						
	0.1	09/16/1996	1410	0.23	<0.05	<0.05	0.05						
Average				0.43			0.05						
WI - 13	0.1	04/22/1997	1330	0.6	<0.05	<0.05	<0.1	0.19	0.04	1	1.23	0.02	0.02
	0.1	05/22/1997	1445	0.33	<0.05	<0.05	<0.04	0.12	0.03	1.2	1.35	0.08	0.02
	0.1	06/25/1997	1020	0.3	0.27	<0.05	0.06	0.02	0.07	1.4	1.49	0.07	0.03
	0.1	07/23/1997	1450	0.36	0.08	<0.05	0.08	0.11	0.01	0.8	0.92	0.08	0.04
	0.1	08/18/1997	1000	0.4	<0.05	<0.05	0.04	0.03	0.02	0.7	0.75	0.09	0.02
	0.1	09/17/1997	1330	0.32	0.06	<0.05	0.07	0.1	0.06	1.2	1.36	0.31	0.04
Average				0.39	0.14		0.06	0.10	0.04	1.05	1.18	0.11	0.03

Station	Depth M	Date mm/dd/yy	Time hhmm	Atrazine ug/L	Alachlor ug/L	Metolachlor ug/L	Cyanazine ug/L	Ammonia mg/L	NO3/NO2 mg/L	TKN mg/L	TN mg/L	T - Phos mg/L	T - Ortho-P mg/L
WI - 13	0.1	04/21/1998	0915	0.13	<0.05	<0.05	<0.04	0.09	0.01	0.3	0.4	0.05	0.02
	0.1	05/20/1998	1000	0.22	<0.05	<0.05	0.05	<0.01	0.03	1	1.03	0.12	0.01
	0.1	06/10/1998	0945	0.2	<0.05	<0.05	<0.04	<0.02	0.13	0.9	1.03	0.02	0.02
	0.1	07/13/1998	0830	0.21	0.05	<0.05	<0.04	0.18	0.02	0.8	1	0.03	0.01
	0.1	08/10/1998	0945	0.18	<0.05	<0.05	<0.04	<0.02	0.02	1	1.02	0.12	0.02
	0.1	09/09/1998	0920	0.16	<0.05	<0.05	<0.04	0.07	0.1	0.6	0.77	0.06	0.03
Average				0.18	0.05		0.05	0.11	0.05	0.77	0.88	0.07	0.02
WI - 13	0.1	04/12/1999	1120	0.17	< 0.05	< 0.05	< 0.04	U	0.07	0.58	0.65	0.03	0.01
	0.1	05/11/1999	0804	0.13	<0.05	<0.05	<0.04	0.09	0.05	0.76	0.9	0.02	0.01
	0.1	06/10/1999	0915	0.09	<0.05	<0.05	<0.04	0.04	0.07	0.95	1.06	0.03	0.02
	0.1	07/14/1999	0912	0.13	<0.05	<0.05	0.19	0.09	0.03	0.79	0.91	0.05	U
	0.1	08/18/1999	0957	0.19	<0.05	0.05	<0.04	U	0.06	0.72	0.78	0.01	0.03
	0.1	09/22/1999	0934	0.2	<0.05	<0.05	<0.04	U	U	0.72	0.72	0.02	0.01
Average				0.15		0.05	0.19	0.07	0.06	0.75	0.84	0.03	0.02
WI - 13	18	06/28/1996	0948	0.3	<0.05	0.06	<0.04						
	18	08/12/1996	1518	0.5	<0.05	0.12	0.11						
	18	09/16/1996	1428	0.43	<0.05	0.06	0.08						
Average				0.41			0.08	0.10					
WI - 13	18	04/22/1997	1348	0.19	<0.05	<0.05	0.1	0.24	0.04	0.9	1.18	0.01	0.01
	18	05/22/1997	1503	1	<0.1	<0.1	<0.1	0.17	0.04	1.5	1.71	0.09	0.03
	18	06/25/1997	1038	0.24	<0.05	<0.05	0.07	0.1	0.16	1.3	1.56	0.09	0.04
	18	07/23/1997	1508	0.27	0.15	<0.05	0.12	0.11	0.16	0.7	0.97	0.07	0.04
	18	08/18/1997	1018	0.32	<0.05	<0.05	0.05	0.05	0.06	0.9	1.01	0.16	0.02
	18	09/17/1997	1348	0.46	<0.05	<0.05	0.05	0.18	0.12	2.1	2.4	0.13	0.06
Average				0.41	0.15		0.08	0.14	0.10	1.23	1.47	0.09	0.03
WI - 13	18	04/21/1998	0933	0.2	<0.05	<0.05	<0.04	0.22	0.01	0.4	0.63	0.02	0.02
	18	05/20/1998	1018	0.3	<0.05	<0.05	<0.04	0.07	0.04	1.3	1.41	0.05	0.02
	18	06/10/1998	1003	0.17	<0.05	<0.05	<0.04	0.18	0.11	1.2	1.49	0.06	0.05
	18	07/13/1998	0848	0.23	0.05	<0.05	0.04	0.02	0.17	1.1	1.29	0.09	0.01
	18	08/10/1998	1003	0.21	0.06	<0.05	0.05	0.04	0.04	1	1.08	0.24	0.03
	18	09/09/1998	0938	0.2	<0.05	<0.05	0.04	0.1	0.29	0.6	0.99	0.06	0.03
Average				0.22	0.06		0.04	0.11	0.11	0.93	1.15	0.09	0.03
WI - 13	18	04/12/1999	1138	0.16	< 0.05	< 0.05	< 0.04	0.03	0.06	2.72	2.81	0.6	0.02
	18	05/11/1999	0822	0.12	<0.05	<0.05	<0.04	0.16	0.05	0.96	1.17	0.09	0.02
	18	06/10/1999	0933	0.14	<0.05	<0.05	<0.04	0.06	0.07	0.75	0.88	0.03	0.02
	18	07/14/1999	0930	0.1	<0.05	0.61	0.16	0.12	0.03	0.79	0.94	0.04	U
	18	08/18/1999	1015	0.19	<0.05	0.08	<0.04	0.08	U	1.42	1.5	0.15	0.04
	18	09/22/1999	0952	0.23	<0.05	<0.05	<0.04	U	U	0.84	0.84	0.04	0.01
Average				0.16		0.35	0.16	0.09	0.05	1.25	1.36	0.16	0.02

Station	Depth M	Date mm/dd/yy	Time hhmm	Atrazine ug/L	Alachlor ug/L	Metolachlor ug/L	Cyanazine ug/L	Ammonia mg/L	NO3/NO2 mg/L	TKN mg/L	TN mg/L	T - Phos mg/L	T - Ortho-P mg/L
WI - 15A	0.1	06/28/1996	0900	0.3	<0.05	<0.05	<0.04						
	0.1	07/19/1996	1930	0.39	<0.05	<0.05	<0.04						
	0.1	08/12/1996	1530	0.33	<0.05	0.16	0.7						
	0.1	09/16/1996	1420	0.5	<0.05	0.05	0.06						
	Average			0.38		0.11	0.38						
WI - 15A	0.1	04/22/1997	1345	0.22	<0.05	<0.05	0.07	0.58	0.05	0.9	1.53	<0.01	0.01
	0.1	05/22/1997	1500	0.3	<0.05	<0.05	0.06	0.09	0.03	1.3	1.42	0.08	0.02
	0.1	06/25/1997	1040	0.26	<0.05	<0.05	<0.1	<0.02	0.08	1	1.08	0.08	0.03
	0.1	07/23/1997	1500	0.26	0.13	<0.05	0.12	0.19	0.01	0.9	1.1	0.05	0.04
	0.1	08/18/1997	1025	0.46	0.08	<0.05	<0.04	0.02	0.01	1	1.03	0.16	0.02
	0.1	09/17/1997	1350	0.35	<0.05	<0.05	0.05	0.08	0.07	1	1.15	0.13	0.04
	Average			0.31	0.11		0.08	0.19	0.04	1.02	1.22	0.10	0.03
WI - 15A	0.1	04/21/1998	0930	0.2	<0.05	<0.05	0.04	0.03	0.01	0.6	0.64	0.02	0.02
	0.1	05/20/1998	1015	0.23	<0.05	<0.05	0.05	0.02	0.04	1.1	1.16	0.02	0.01
	0.1	06/10/1998	1000	0.16	<0.05	<0.05	<0.04	<0.02	0.1	0.8	0.9	0.03	0.03
	0.1	07/13/1998	0845	0.22	<0.05	<0.05	<0.04	0.05	0.02	1	1.07	0.07	0.01
	0.1	08/10/1998	1020	0.18	<0.05	<0.05	0.04	<0.02	0.02	1.3	1.32	0.15	0.02
	0.1	09/09/1998	0935	0.2	<0.05	<0.05	<0.04	0.08	0.49	0.4	0.97	0.06	0.03
	Average			0.20			0.04	0.05	0.11	0.87	1.01	0.06	0.02
WI - 15A	0.1	04/12/1999	1145	0.16	<0.05	<0.05	<0.04	U	0.07	0.67	0.74	0.06	0.01
	0.1	05/11/1999	0840	0.16	<0.05	<0.05	<0.04	0.09	0.04	0.75	0.88	0.02	0.01
	0.1	06/10/1999	0930	0.16	<0.05	<0.05	<0.04	0.19	0.07	0.78	1.04	0.02	0.02
	0.1	07/14/1999	0932	0.2	<0.05	<0.05	0.09	0.03	0.03	0.73	0.79	0.04	U
	0.1	08/18/1999	1010	0.17	<0.05	0.06	<0.04	U	U	0.77	0.77	0.04	0.03
	0.1	09/22/1999	0943	0.23	<0.05	<0.05	<0.04	U	U	0.68	0.68	0.02	U
	Average			0.18		0.06	0.09	0.10	0.05	0.73	0.82	0.03	0.02
WI - 15A	18	06/28/1996	0918	0.29	<0.05	<0.05	<0.04						
	18	07/19/1996	1948	0.4	<0.1	0.1	<0.1						
	18	08/12/1996	1548	0.45	<0.05	<0.05	0.09						
	18	09/16/1996	1438	0.47	<0.05	0.09	0.05						
	Average			0.40		0.10	0.07						
WI - 15A	18	04/22/1997	1403	0.23	<0.05	<0.05	0.21	0.55	0.01	1.2	1.76	<0.01	0.01
	18	05/22/1997	1518	0.27	<0.05	<0.05	0.06	0.17	0.03	1.3	1.5	0.05	0.02
	18	06/25/1997	1058	0.26	0.11	<0.05	0.05	0.05	0.17	1	1.22	0.09	0.03
	18	07/23/1997	1518	0.32	0.07	<0.05	0.09	0.15	0.15	0.5	0.8	0.07	0.04
	18	08/18/1997	1043	0.37	0.07	<0.05	0.06	0.04	0.03	2	2.07	0.11	0.05
	18	09/17/1997	1408	0.45	<0.05	<0.05	0.05	0.11	0.06	0.7	0.87	0.13	0.03
	Average			0.32	0.08		0.09	0.18	0.08	1.12	1.37	0.09	0.03

Station	Depth M	Date mm/dd/yy	Time hhmm	Atrazine ug/L	Alachlor ug/L	Metolachlor ug/L	Cyanazine ug/L	Ammonia mg/L	NO3/NO2 mg/L	TKN mg/L	TN mg/L	T - Phos mg/L	T - Ortho-P mg/L
WI - 15A	18	04/21/1998	0948	0.19	<0.05	<0.05	<0.04	0.03	<0.01	0.4	0.43	0.03	0.02
	18	05/20/1998	1033	0.31	<0.05	<0.05	0.06	0.07	0.04	1.2	1.31	0.02	0.02
	18	06/10/1998	1018	0.23	<0.05	0.07	<0.04	<0.02	0.13	0.6	0.73	0.02	0.02
	18	07/13/1998	0903	0.2	0.06	<0.05	0.04	0.31	0.27	0.8	1.38	0.04	0.01
	18	08/10/1998	1038	0.2	0.06	<0.05	0.04	0.1	0.04	1.6	1.74	0.2	0.02
	18	09/09/1998	0953	0.17	<0.05	<0.05	<0.04	0.08	0.29	0.6	0.97	0.06	0.03
	Average			0.22	0.06	0.07	0.05	0.12	0.15	0.87	1.09	0.06	0.02
WI - 15A	18	04/12/1999	1203	0.16	< 0.05	< 0.05	< 0.04	U	0.07	1.69	1.76	0.27	0.02
	18	05/11/1999	0858	0.14	<0.05	<0.05	<0.04	0.24	0.04	0.88	1.16	0.08	0.02
	18	06/10/1999	0948	0.15	<0.05	<0.05	<0.04	0.17	0.07	1.31	1.55	0.1	0.03
	18	07/14/1999	0950					0.04	0.02	0.92	0.98	0.04	U
	18	08/18/1999	1028	0.15	<0.05	<0.05	<0.04	0.03	0.01	0.96	1	0.09	0.04
	18	09/22/1999	1001	0.2	<0.05	<0.05	<0.04	U	0.04	0.64	0.68	0.02	U
	Average			0.16				0.12	0.04	1.07	1.19	0.10	0.03